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SOME TROPICAL CUP-FUNGI

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(WITH PLATES 88-90)

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The genus *Cookeina* was established by O. Kuntze to take the place of *Trichoscypha* of Saccardo, the latter name being untenable. A month later the genus *Pilocratera* was proposed by P. Hennings for the same reason, apparently without knowledge of Kuntze's work. The name *Pilocratera* was adopted by Lindau in Engler & Prantl's *Natürlichen Pflanzenfamilien*, but incorrectly so since the name proposed by Kuntze had priority. The genus is most closely allied to *Sarcoscypha* of Saccardo, but the species which are essentially tropical are probably distinct enough to be retained in a separate genus.

As the name implies, the plants are usually hairy and the hairs when present are composed of a fascicle of mycelial threads the whole tapering into a bristle-like apex. In one species, *C. Colensoi*, which is here included with the genus, the hairs are absent and the outside of the cup is clothed with granules consisting of loosely arranged cells. While well-developed hairs are wanting in this species other characters indicate a close relationship with the other members of the genus to which it undoubtedly belongs.

Another character of the genus which deserves especial mention is the peculiar markings of the spores. Three of the four species examined have striate spores. In one species, *C. insititia*, no striations were observed. However, as only one collection of this species has been seen it is possible that a further study of the species will reveal this character. The striations are not in

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the nature of thickenings or cracks such as those found in some of the Ascobolaceae but are light and dark bands extending from one end of the spore to the other but not roughening its surface, at least so far as can be determined. The width of the bands varies in different species. This character seems to be more common in tropical ascomycetes than in temperate and northern species, having also been observed by the writer in several of the tropical Hypocreales. It has also been mentioned by Doctor Thaxter in the genus *Wyneea* which genus is tropical although one species runs up into the northern United States. There may be no significance in this coincidence but it is sufficiently striking to deserve mention. All of the species examined in the present genus have either fasciculate hairs or striate spores or both; all are bright colored, more or less stipitate, of a tough consistence, grow on wood and have a similar distribution.

The genus *Phillipsia* which is treated in this paper shows a very close relationship with *Cookeina*. One species of the genus has been frequently collected in the West Indies and until recently has been filed away in our collections as an unnamed species of *Sarcoscypha*. In fact the plants very closely resemble our *Sarcoscypha coccinea*. The color of the hymenium is darker being reddish-purple instead of scarlet and the spores are unequal-sided and marked with the striations referred to in connection with *Cookeina*. The great variability in the stem and other gross characters has doubtless led to the multiplication of synonyms in this species. The genus *Phillipsia* was based on specimens in which the stem was almost wanting and had the nature of the plant been fully appreciated it is possible that the species might have been included with the preceding genus. Berkeley in describing *Peziza domingensis*, type of the genus *Phillipsia*, says,—“Though not oblique, it seems to be nearest to such species as *P. onotica*, or perhaps the two pedunculate species which follow [*Peziza Hystrix* and *Peziza Hindsii*].” This is the only reference seen which bears upon the relationship of *Phillipsia* and *Cookeina*. The striation of the spores is a character common to both genera but one which has apparently been overlooked, for it is not usually mentioned in the descriptions of any of the species of either genus except *Peziza striispora* Ellis & Everhart, which is here included as a synonym of *Cookeina Tricholoma*.

These studies are based on material in the herbarium of the Garden including numerous specimens obtained by Garden collectors in the West Indies and Mexico. The collections in several cases are accompanied by colored sketches made in the field by Mrs. Norman Taylor. These sketches show the colors to be a much brighter red than is shown in the published illustrations of the various species which must have been made from dried material or by guess from the descriptions. The photographs are made from dried material which in some cases is partially revived by wetting. On account of the tough consistence of the plants of these two genera they do not shrink a great deal in drying and the photographs compare very favorably with the drawings made from fresh material so far as the form of the cups is concerned. While these photographs do not bring out the colors they show many details which it is impossible to show even in a colored sketch. Drawings are made with the aid of a camera lucida, all spores being drawn to a common scale.

COOKEINA O. Kuntze, Rev. Gen. Pl. 2: 849. 1891

Peziza § *Trichoscypha* Cooke, Mycogr. 252. 1879.

Trichoscypha Sacc. Syll. Fung. 8: 160. 1889. Not *Trichoscypha* Hooker. 1862.

Pilocratera P. Henn. in Engler, Bot. Jahr. 14: 363. 1891.

Plants stipitate or substipitate, bright-colored, some shade of red or yellow, hairy or pruinose; hairs when present fasciculate; substance tough, not shrinking much in drying; asci 8-spored; spores hyaline or subhyaline, ellipsoid to fusoid, usually striate, striations consisting of light and dark bands extending lengthwise of the spore; paraphyses present, filiform.

Type species, *Peziza Tricholoma* Mont.

KEY TO THE SPECIES

Cups clothed with well-developed hairs.

Hairs long and conspicuous, covering the outside of the cup. *C. Tricholoma*.

Hairs short and inconspicuous, mostly near the margin of the cup.

Cups large, shallow; spores $27-33 \times 14-18 \mu$.

C. sulcipes.

Cups small, deep; spores $40-50 \times 10-12 \mu$.

C. insititia.

Cups pruinose but with no well-developed hairs.

C. Colensoi.

COOKEINA TRICHOLOMA (Mont.) O. Kuntze, Rev. Gen. Pl. 2:
849. 1891

Peziza Tricholoma Mont. Ann. Sci. Nat. II. 2: 77. 1834.

Peziza Hystrix Berk. Ann. Mag. Nat. Hist. II. 9: 201. 1852.

Trichoscypha Tricholoma Sacc. Syll. Fung. 8: 160. 1889.

Pilocratera Tricholoma P. Henn. in Engler, Bot. Jahrb. 14: 364.
1892.

Peziza striispora Ellis & Ev. Bull. Lab. Nat. Hist. State Univ.
Iowa 4: 69. 1896.

Sarcoscypha striispora Sacc. Syll. Fung. 14: 754. 1899.

Plants stipitate, cup-shaped, with the margin slightly incurved, 1–1.5 cm. in diameter and about 1 cm. deep; stem often so short that the plants appear to be sessile or 2–3 cm. long and about 2 mm. thick, exterior of the cup as well as the stem entirely clothed with long hairs which are more numerous around the margin forming an incurved border, entire plant deep-red or nearly scarlet and a little paler outside, fading in dried plants to pale-orange; hairs often 2–3 mm. long and 100–175 μ in diameter at the base, gradually tapering toward the apex, whitish or pale-brown and composed of a dense fascicle of mycelial threads; asci cylindric, about 350–375 \times 20 μ , abruptly extended below into a short appendage-like base; spores ellipsoid to fusoid, about 27–33 \times 12–14 μ , hyaline or subhyaline with one or two large oil-drops and granular within, usually marked with delicate, longitudinal striations; paraphyses filiform, slender, slightly enlarged upwards.

On old wood and bark.

TYPE LOCALITY, Central America.

DISTRIBUTION: West Indies, Mexico, Central America, and Philippine Islands. Also reported from Australia and South America.

ILLUSTRATIONS: Ann. Sci. Nat. II. 2: pl. 4, f. 2; Cooke, Mycogr. pl. 51, f. 202; Engler-Prantl, Nat. Pfl. 1¹: 195, f. 155, C-E.

Massee¹ states,—“The two species enumerated above [*Peziza sulcipes* and *Peziza Hindsii*] are synonyms of each other, and in turn both are synonymous with *Peziza tricholoma* Mont.” There seems to be no doubt as to the identity of *Peziza sulcipes* and *Peziza Hindsii* but from our own studies based on material col-

¹ Jour. Linn. Soc. 31: 507.

lected in the West Indies, *Peziza Tricholoma* Mont. appears to be distinct. The difference is shown in the accompanying photograph (plate 88).

One new synonym is here added to the list, *Peziza striispora* Ellis & Everhart. This species was described from material collected at Castillo, Nicaragua. The type could not be found in the Ellis Collection but the description, locality, etc, leave little chance for doubt as to its identity.

COOKEINA SULCIPES (Berk.) O. Kuntze, Rev. Gen. Pl. 2: 849.
1891

Peziza sulcipes Berk. in Hooker's London Jour. Bot. II. 1: 141.
1842.

Peziza Hindsii Berk. in Hooker's London Jour. Bot. II. 1: 456.
1842.

?*Peziza Afzelii* Fries, Nov. Acta Reg. Soc. Scient. Upsal. III.
1: 121. 1855.

Trichoscypha Hindsii Sacc. Syll. Fung. 8: 161. 1889.

Trichoscypha sulcipes Sacc. Syll. Fung. 8: 161. 1889.

?*Trichoscypha Afzelii* Sacc. Syll. Fung. 8: 161. 1889.

Cookeina Hindsii O. Kuntze, Rev. Gen. Pl. 2: 849. 1891.

?*Cookeina Afzelii* O. Kuntze, Rev. Gen. Pl. 2: 849. 1891.

?*Pilocratera Engleriana* P. Henn. in Engler, Bot. Jahr. 14: 363.
1892.

Pilocratera Hindsii Lindau, in Engler-Prantl, Nat. Pfl. 1: 195.
1897.

Geopyxis clata Masee, Bull. Royal Gardens, Kew 1898: 123.
1898.

Plants stipitate, cup-shaped, 1-2 cm. in diameter and about 1 cm. deep or sometimes more shallow, exterior of the cup often marked with several concentric rings near the margin and fringed with very short hairs which are more numerous at or near the margin of the cup, hymenium deep-orange to nearly scarlet, externally paler, fading to pale-yellow in dried specimens; stem often so short that the cups appear to be sessile but occasionally as long as 3 cm. and about 2 mm. thick; hairs comparatively short, subconical in form, about 400-500 μ long and 75-100 μ broad at the base gradually tapering toward the apex, composed of a dense

fascicle of mycelial threads, pale yellow; asci cylindrical, about $300-350 \times 20 \mu$ with a short appendage-like stem; spores ellipsoid with the ends slightly narrowed, hyaline or subhyaline with one or two large oil-drops and granular within, $27-33 \times 14-18 \mu$, longitudinally marked with delicate striations; paraphyses filiform, slightly enlarged above.

On old wood and bark.

TYPE LOCALITY, Surinam, South America.

DISTRIBUTION: West Indies, Mexico to South America. Also reported from Australia.

ILLUSTRATIONS: Hooker's London Jour. Bot. II. 1: *pl. 15* (in part); Cooke, Mycogr. *pl. 51, f. 199, 200*; Cooke, Australian Fungi, *f. 153*; Engler-Prantl, Nat. Pfl. 1¹: 195, *f. 155, F, G*; Engler, Bot. Jahrb. 14: *pl. 6, f. 9*.

One new synonym is added to the list above, *Geopyxis elata* Masee. I have examined the type of this species and find it identical in every respect with *Peziza sulcipes* Berk. While the type of *Pilocratera Engleriana* P. Henn. has not been seen, the description fits this species very closely and it is probably the same. In describing this species Hennings emphasizes the presence of the stripes about the outer margin of the cups which is characteristic of *C. sulcipes*.

COOKEINA INSITITIA (Berk. & Curt.) O. Kuntze, Rev. Gen. Pl. 2: 849. 1891

Peziza insititia Berk. & Curt.; Berk. & Br. Jour. Linn. Soc. 14: 103. 1875.

Trichoscypha insititia Sacc. Syll. Fung. 8: 161. 1889.

Plants deep cup-shaped, stipitate, cup about 5-7 mm. in diameter and of about the same depth, yellow when dry (probably much brighter when fresh), clothed about the margin with rather numerous fasciculate hairs; hairs very broad at the base, often nearly $400-500 \mu$ and 1-2 mm. in length; stem slender, 1-2 mm. in diameter and of variable length but often attaining 1 cm.; asci cylindrical, very long, often $500 \times 15-18 \mu$; spores 1-seriate or with the ends overlapping, fusiform, filled with oil-drops and granules, curved or unequal-sided, $40-50 \times 10-12 \mu$, subhyaline; paraphyses filiform, slightly enlarged above.

On wood.



COOKEINA COLENSOI (Berk.) Seaver
COOKEINA INSITITIA (Berk. & Curt.) O. Kuntze
PHILLIPSIA DOMINGENSIS Berk.

TYPE LOCALITY: Peradeniya, Ceylon.

DISTRIBUTION: Philippine Islands, Ceylon, and Bonin Islands,

ILLUSTRATIONS: Cooke, Mycogr. *pl.* 51, *f.* 201; Jour. Linn. Soc. 31: *pl.* 16, *f.* 26.

This species has not been found in the West Indies so far as known but it is not unlikely that it will be found to occur there. It is closely related to the other members of the genus but can be distinguished by the form of the cups and by differences in the spores.

Cookeina Colensoi (Berk.)

Peziza Colensoi Berk. in Hooker's Fl. New Zealand 2: 200. 1855.

Peziza aluticolor Berk. Proc. Linn. Soc. 13: 176. 1873.

Sarcoscypha Colensoi Sacc. Syll. Fung. 8: 157. 1889.

Geopyxis aluticolor Sacc. Syll. Fung. 8: 64. 1889.

Plants stipitate or substipitate, shallow cup-shaped, 1–1.5 cm. in diameter and about 5 mm. deep, dried plants pale-yellow (probably much brighter when fresh) marked with concentric rings about the outer margin, externally covered with loose cells which sometimes approach rudimentary hairs but with no well-developed hairs, wrinkled when dry especially near the base of the cup; stem very short or almost wanting, sometimes not more than 1 mm. in length, never long as in related species; asci cylindrical, about $400\text{--}475 \times 20 \mu$, gradually tapering below; spores 1-seriate or with the ends slightly overlapping, fusoid with the ends quite strongly narrowed, with one or two large oil-drops and granular within, striations consisting of several broad, longitudinal bands extending the length of the spore, $30\text{--}40 \times 12\text{--}15 \mu$; paraphyses filiform, scarcely enlarged above.

On wood and bark.

TYPE LOCALITY: New Zealand.

DISTRIBUTION: West Indies, New Zealand, Australia, and Africa.

ILLUSTRATIONS: Hooker's Fl. New Zealand 2: *pl.* 105, *f.* 5; Cooke, Mycogr. *pl.* 50, *f.* 198.

The plants of this species examined are almost sessile although the species is often described and illustrated with a stem several mm. long. The stem is probably variable as in other species of the genus although it has never been found to attain the length characteristic of other species of the genus. With the exception